

# Space News Roundup

## 'On the road to STS-26'

*This week's long duration simulation is seen as a significant milestone for MOD*

By Kelly Humphries



Stokes McMillan, lead SimSup for the 61M(T) exercise, works with data in the Bldg. 30 Simulation Control Area during an 8-hour Joint Integrated Simulation (JIS) of IUS-TDRS deployments. The April 14 sim was one of several precursors to the April 28-30 long-duration sim.

When the 61M(T) long duration sim gets under way this week, it will be not only a milestone on the way to STS-26, but also the culmination of almost a year of exhaustive effort in the Mission Operations Directorate.

The JSC mission operations team is scheduled to begin the 56-hour Operational Readiness Exercise (ORE) at 9 a.m. Tuesday. It will be a dry-run of all STS-26 flight phases, but also a chance to exercise new people, procedures and equipment which have come on line in the past year.

"What we've done is examine every job we do," said Mission Operations Director Eugene F. Kranz. "That involves thousands of people and hundreds of thousands of steps, and we've pulled it apart, looked at the process under a microscope and studied it from the very beginning. The entire objective of 61M(T) is to exercise the people, the process and the new tools we are using."

Lead Flight Director Chuck Shaw said the 61M(T) sim will also be an important milestone for flight controllers looking forward to the resumption of mission operations.

"The entire 61M(T) exercise is a significant mental milestone on the road to STS-26," Shaw said. "It's exciting and the anticipation is a welcome feeling."

A similar long-duration exercise under classified or "red" conditions, known as 81M(T), is scheduled for mid-summer, Kranz said.

The 61M(T) sim will take a "snapshot" of the latest available vehicle modifications, flight software and flight rules, Shaw said, and duplicate all payload activities planned for STS-26. The primary objective is deployment of a Tracking and Data Relay Satellite (TDRS), just as on STS-26.

"I think this is going to give everybody a taste of what it's like to fly again," said Stokes McMillan, the lead Sim Supervisor (SimSup). "This is just the mid-term exam. The final exam will be the flight."

Approximately 150 JSC workers and another 200 workers at other sites will participate, McMillan said.

At JSC, the exercise will involve three full Simulation Control Area (SCA) teams, three Shuttle Mission Simulator (SMS) teams, a five-person crew, three full Flight Control Teams, a simulated Mission Management Team (MMT), Payload Integration Management (PIM), the National Oceanic and Atmospheric Administration (NOAA) Weather Office, the Public Affairs Office and Houston TV.

Also participating will be teams at the Shuttle Operations Support Center (SOSC) at Onizuka Air Force Station, Sunnyvale, Calif., Edwards Air Force Base, Goddard Space

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## Young named as special assistant to Cohen

Astronaut Office Chief John W. Young has been appointed by JSC Director Aaron Cohen as Special Assistant to the Center Director for Engineering, Operations and Safety. The appointment is effective April 27.

In his new position, Young will have direct and immediate access to the Center Director and other senior managers to aid in the timely definition and resolution of issues affecting the safe return to flight of the Space Shuttle.

"John Young's acceptance of this new responsibility will strengthen

the link between operational and engineering elements at the Johnson Space Center," Cohen said. "John's extensive flight experience, coupled with his engineering background and his solid judgement on flight safety, will be particularly important in returning the Shuttle to flight status."

Young will also advise Cohen on engineering, operational and safety aspects of the Space Station and other initiatives, such as the second generation Shuttle and the National Aerospace Plane.

As the nation's most experienced

astronaut, with six space missions spanning the Gemini, Apollo and Space Shuttle eras, Young will remain eligible to command future Shuttle astronaut crews.

Henry Hartsfield, Deputy Chief of the Astronaut Office, will assume Young's Astronaut Office duties until his permanent successor is selected. The announcement of a successor is expected in the next few weeks.

Young, 56, has been Chief of the Astronaut Office since January 1974. He was among the second group of astronauts selected by NASA in

September 1962 and is the first person to have flown in space six times.

Young flew on Gemini 3, Gemini 10, Apollo 10, Apollo 16, STS-1 and STS-9.

He is the recipient of the Congressional Space Medal of Honor, the Goddard, Collier and Harmon Trophies, the National Geographic Society Hubbard Medal, three NASA Distinguished Service Medals, three Haley Space Flight Awards and more than 45 other major awards, in addition to four honorary doctorate degrees.



John W. Young

## Work begins on Bldg. 9B

Work has begun on a twin to Bldg. 9A that will add 27,000-square feet of working space to the Systems Integration and Mockup Laboratory.

The new structure, to be known as Bldg. 9B, is scheduled for completion around February of 1988.

The addition, which will be used for Space Station mockups and trainers, will consist of a 21,000-square-foot high bay area and a 6,000-square-foot one-story support area that will provide staging and work space for approximately 35 technicians.

The high bay addition, designed to blend with the architecture of the current mockup laboratory, will be a steel frame structure with precast exposed aggregate facing, or PEA, panels.

Some of the existing features of Bldg. 9A will be incorporated into Bldg. 9B. The west end of Bldg. 9A will be opened up and the large access door there will be moved to the west end of Bldg. 9B. The rails for Bldg. 9A's two existing 20-ton traveling cranes will be extended

into the new addition for use in handling mockups and large structures.

The technical support area also will be a steel frame and PEA panel structure.

Although initial construction will cause the loss of some parking places on the west side of Bldg. 9A, additional slots will be added at the north and west of the new addition, ultimately meaning a net gain of 81 parking places, according to Project Engineer Jesse Goodson.

Although construction and design of the new facility are fairly straightforward, Goodson said there will be two especially challenging features of the project.

One challenge will be the erection of wind buttress towers at the junction of 9A and 9B. Goodson said the buttresses, built of steel tubing, will be necessary to counteract the loss of Bldg. 9A's west end wall. The buttresses will prevent any lateral movement of the structure in high winds.

Another challenge will be removing the large doors at the west end

of 9A and installing them at the west end of 9B, Goodson said.

Since the utilities in Bldg. 9A are used to capacity, Goodson said, the construction of Bldg. 9B will be much like putting up a new building, rather than just an addition. The addition will get its steam, chilled water and electricity directly from site distribution via the underground utility tunnel system. Bldg. 9B also will require the addition of five new air handlers.

Goodson said the access road along the north side of the area will probably be closed "off and on for two or three months" for utility development.

Progress on the addition has been fairly brisk for a major Construction of Facilities project. A preliminary engineering report was prepared in the summer of 1985. Design drawings and specifications were completed in November 1986 and construction bids were opened March 16 of this year. The low bidder was Valcon II, Inc. of Houston. The notice to proceed with construction work was issued April 1.

## Two symposiums highlight spring activities at JSC

For JSC's technical community, the spring will be highlighted by two important technical symposiums coming up in the next few days.

The 21st Aerospace Mechanisms Symposium will be held at JSC from April 29 through May 1. Sponsored jointly by NASA, the California Institute of Technology and Lockheed Missiles & Space Co., the symposium will cover the latest technology in large space structures, robotics, space mechanisms and materials.

Two weeks later, on May 14, the Houston Section of the American Institute of Aeronautics and Astronautics will sponsor the 12th Annual Technical Symposium, co-hosted by the University of Houston-Clear Lake High Technologies Laboratory. Symposium sessions will include topics such as communications systems, structures, life sciences and ethics in aerospace.

The Aerospace Mechanisms Symposium rotates annually between eight NASA centers and attracts papers and attendees internationally. Employees are welcome to attend any of the presentations, which will be held in the Bldg. 2 Teague Auditorium.

The symposium will begin with introductory remarks at 10 a.m. April 29. Sessions begin at 8 a.m. April 30 and 9 a.m. May 1.

The AIAA Technical Symposium will begin with registration at 8:15 a.m. May 14 at the Bayou Bldg. on the campus of the University of Houston-Clear Lake. Concurrent morning sessions will begin at 9 a.m. and continue at 20-minute intervals until noon.

Afternoon sessions, also running at 20-minute intervals, will begin at 1 p.m.

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## Bulletin Board

### Members sought for JSC 'Superstars' team

Twenty JSC employees interested in representing the center in a charitable athletic competition in June are being sought. The Houston Superstars, Inc., sponsor of the competition, is a non-profit organization. All profits from the event June 2-6 will be donated to the Special Olympics of Houston. The competition, patterned after the ABC "Superstars" television program, pits 25 corporate teams against one another in 17 events. Each team has ten female and ten male members, and each event is co-ed. Events include swimming, ping pong, billiards, running, volleyball and tennis. The "Houston Cup" is kept by the first place team each year. Exxon Corp. has held the cup for the last four years. The entry fee for the JSC team will be paid by the Employee Activities Association, which will limit participation to civil service and military employees only. For more information, call Sammy Payne at x38000 or x38057, Code ZR.

### DPSD graphics exposition is May 20

The Data Processing Systems Division (DPSD) will sponsor a computer graphics exposition from 9:30 a.m. to 4:30 p.m. May 20 in the Product Demonstration Facility. Approximately 12 software vendors will be at the expo, demonstrating graphics for business charts, word charts, clip art, freehand drawing, computer-aided design, statistics, flowcharts and other applications. The Product Demonstration Facility, located in Rm. 112, Bldg. 12, is open from 8:30 a.m. to 4:30 p.m. For more information on the graphics expo or other products located in the PDF, call the Help Desk at 280-4800.

### CLHS garage sale to benefit Challenger Center

The students and faculty of Clear Lake High School are holding a community garage sale May 9 to benefit the Challenger Center. Organizers of the garage sale hope to raise as much as \$20,000, according to Delores Kenyon, an instructor at the high school. Students have been gathering items for several weeks, and poster contests among students from kindergarten to high school age have been underway to help promote the sale. Corporate sponsors include KQQK-FM, Krogers, Lake Office Supply, the Clear Lake Chamber of Commerce and the Clear Lake Jaycees. The sale will be held from 8 a.m. to 4 p.m. in the commons of the high school's main building. The public is invited to donate, as well as to attend. For more information, call Clear Lake High School at 488-6670, x236, after noon.

## Gilruth Center News

Call x30304 for more information

**Almost Anything Goes** — Ten teams of 6 people each (3 male and 3 female) are required for this annual JSC Picnic event. The cost is \$10 per team and every team member gets a T-shirt.

**Softball tournaments** — A mixed softball tournament will be held May 9 and 10. The entry fee is \$95 and the deadline for registration is May 6.

**Beginning tennis** — This class begins May 4 and runs for 8 weeks from 5:15 to 6:15 p.m. The cost is \$32 per person.

**Exercise class** — The next exercise class at the Rec Center meets Mondays and Wednesdays from 5:15 to 6:15 p.m. for 8 weeks beginning May 11. The cost is \$24 per person.

**Aerobics** — This class meets Tuesdays and Thursdays from 5:15 to 6:15 p.m. for 8 weeks beginning May 12. The cost is \$24 per person.

**Weight safety** — This class, a requirement for those wishing to use the Rec Center weight room, will meet May 8 from 8 to 9:30 p.m.

**Defensive driving** — The next defensive driving course, good for a reduction in auto insurance rates, will be held May 30. Call the Rec Center for details.

**Scuba** — The next NAUI-certified scuba course begins June 8. For details, call the Rec Center.

**Physical fitness** — The next 12-week JSC Physical Fitness Program will be held July 6 to Sept. 25. The class meets from 6:30 to 7:30 a.m. Monday, Wednesday and Friday. All NASA and contractor employees and dependents are eligible on completion of an acceptable physical exam and a maximal treadmill stress test. Call x30301 for more information.

## Cookin' in the Cafeteria

### Week of April 27 — May 1, 1987

**Monday** — Cream of Chicken Soup; Beef Burgundy over Noodles, Fried Chicken, BBQ Sausage Link, Hamburger Steak (Special); Buttered Corn, Carrots, Green Beans. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

**Tuesday** — Beef Noodle Soup; Baked Meatloaf, Liver & Onions, BBQ Spare Ribs, Turkey & Dressing (Special); Spanish Rice, Broccoli, Buttered Squash.

**Wednesday** — Seafood Gumbo; Broiled Fish, Tamales w/Chili, Spanish Macaroni (Special); Ranch Beans, Beets, Parsley Potatoes.

**Thursday** — Navy Bean Soup; Beef Pot Roast, Shrimp Chop Suey, Pork Chops, Chicken Fried Steak (Special); Carrots, Cabbage, Green Beans.

**Friday** — Seafood Gumbo; Broiled Halibut, Fried Shrimp, Baked Ham, Tuna & Noodle Casserole (Special); Corn, Turnip Greens, Stewed Tomatoes.

### Week of May 4 — 8, 1987

**Monday** — Chicken Noodle Soup; Wieners & Beans, Round Steak w/Hash Browns, Meatballs & Spaghetti (Special); Okra & Tomatoes, Carrots, Whipped Potatoes. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

**Tuesday** — Beef and Barley Soup; Beef Stew, Shrimp Creole, Fried Chicken (Special); Stewed Tomatoes, Mixed Vegetables, Broccoli.

**Wednesday** — Seafood Gumbo; Fried Perch, New England Dinner, Swiss Steak (Special); Italian Green Beans, Cabbage, Carrots.

**Thursday** — Cream of Chicken Soup; Turkey & Dressing, Enchiladas w/Chili, Wieners & Macaroni, Stuffed Bell Pepper (Special); Zucchini Squash, English Peas, Rice.

**Friday** — Seafood Gumbo; Baked Cod, 1/4 Broiled Chicken w/Peach Half, Salisbury Steak (Special); Cauliflower au Gratin, Mixed Vegetables, Buttered Cabbage, Whipped Potatoes.

### AT BUILDING #3

On Wednesday we feature The Reuben: Corned Brisket, Swiss Cheese on a bed of Sauerkraut, Poupon Mustard on Rye and 1/4 Pickle. Delicious!

Monday and Thursday check out our French Dip Sandwich.



New procedures, people and systems will be exercised this week in the Mission Control Center during the 61M(T) long-duration sim. Here Lead Flight Director Chuck Shaw confers with team members.

## Long duration simulation

(Continued from page 1)

Flight Center and the White Sands Ground Terminal.

The crew for the sim will be Commander Mike Coats, Pilot John Blaha, and Mission Specialists Anna Fisher, Jim Buchli and Bob Springer.

Flight Directors will be Ron Dittmore, Ascent and Orbit 1; Shaw, lead, Orbit 2 and deployment; and Milt Heflin, planning.

The Ascent Team of flight controllers will begin their shifts in the third-floor Flight Control Room (FCR) at 7:30 a.m. CDT April 28. At 7:45 a.m., the SimSup will conduct a brief review of initial conditions and any off-nominal developments. At 8 a.m., or at a simulated time of launch minus three and a half hours (L-3.5), the JSC National Oceanic and Atmospheric Administration Weather Office will provide a pre-launch weather briefing. Immediately following the weather briefing, there will be a payload briefing.

The nominal timeline for the mission picks up at 9 a.m., which coincides with the point at which the simulated launch count comes out of a built-in hold at L-9 minutes. Launch is scheduled for 9:09 a.m. The first opportunity for TDRS deployment is on revolution 6A at

3:15 p.m. CDT.

After TDRS is deployed and the Orbiter is 10 miles away, the exercise actually becomes two simultaneous sims with Sunnyvale and White Sands taking control of the Inertial Upper Stage (IUS) and TDRS respectively, and the JSC mission operations team continuing the Shuttle mission.

Shaw said the crew will go home for their sleep periods, and the sim team will respond to any alarms that occur when they are away from the simulator.

The Public Affairs Office expects some news media coverage of the sim, and Shaw said normally scheduled change of shift briefings by flight directors will be conducted as the sim allows. Television coverage will be distributed center-wide on closed circuit TV.

The sim will end no later than 5 p.m. CDT April 30, and will be followed by an on-console debriefing from noon to about 4 p.m. CDT the following day.

The lead SCA team consists of McMillan; Brian Ward, Data Processing Systems and Dynamics (DPS/Dynamics); Dave Matthews, Guidance Navigation Control and Propulsion (GNC/Prop); Nadine Papaila, Systems; Stacy Hale, Com-

munications (Comm/Inst); and Bill Preston, Prime Payloads and script coordinator.

McMillan said they "huddled together for two full days" three weeks ago to design the 100 to 150 malfunctions to which the mission operations team will react.

"We walked away saying, 'Ahh, this is going to be a good script,'" said McMillan, who refused to divulge what surprises might be in store for those participating in the sim.

"Even though it doesn't sound like they've got much on board, I think we'll be able to keep them sufficiently busy," he said.

Shaw said he expects the high fidelity environment of the long-duration sim to be particularly helpful to ground centers. The sim will allow flight controllers to practice hand-overs, review flight rules, and exercise both nominal and contingency procedures.

Shaw, a former SimSup, and McMillan, a former member of Shaw's SCA team, said they are especially excited about the exercise because it will give them an opportunity to match wits.

"When he's on," McMillan said, "I can really throw the book at him and he loves it."

## Two honored as small business buyers of the year for JSC

Geraldine Mason and Marsha Fuller have been honored as the JSC Small Business Buyers of the Year for their work in promoting the potential of the small business community.

"Since its inception, NASA has recognized the potential of the small business community and has worked actively to utilize the capabilities within these companies," said Bob Dupstadt, small and disadvantaged business specialist for the Procurement Support Office. "During Fiscal Year 1986, JSC placed more than \$73 million with small business firms, a record amount for the center."

Mason was honored as the JSC buyer whose cooperative efforts resulted in the largest number of new awards to small businesses by



Procurement Director James Neal and Bob Dupstadt pose with Marsha Fuller, left, and Geraldine Mason, JSC's small business buyers of the year.

a single buyer.

Fuller received an award for having the largest dollar volume of new awards to small businesses during the fiscal year.

Each year during Small Business Week, which will be observed in May, the U.S. Small Business Administration honors outstanding

small businesses from around the nation. Barrier-Wear, Inc., a JSC prime contractor, will be presented the SBA Administrator's Award of excellence during this year's award ceremony in Washington, D.C.

Small Business Week begins May 10.

## Symposia

(Continued from page 1)

A plenary session featuring Thomas L. Moser, Director of the Space Station Program at NASA Headquarters, will be held from 4:10 to 5 p.m. in the Bayou Bldg. Auditorium. A wine and cheese reception open to all symposium attendees will follow.

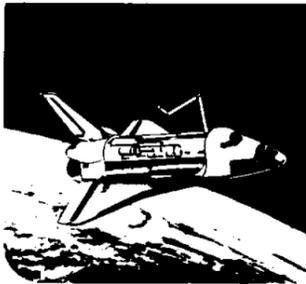
For more information on the Aerospace Mechanisms symposium, call Mary Ledoux, x38806. For more information on the AIAA symposium, call Walter Lueke at x35939.

NASA  
Lyndon B. Johnson Space Center

## Space News Roundup

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Editor: ... Brian Welch  
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# OMIS:

## A lot of information in a small package

By Barbara Schwartz

The once voluminous procedures manual is small and compact, could easily fit in a briefcase, has no torn or dog-eared pages and presents its information in living color.

That at least is the potential for an information system now being evaluated by JSC for Space Station applications.

A miniature headband-mounted television monitor, (as well as a normal TV monitor), a voice-actuated computer system, and a laser disk library are the components of the system, known as the Operation and Maintenance Information System, or OMIS.

A key to the OMIS concept is the fact that more than 54,000 pages of information or pictures can be stored on a single 12-inch diameter laser disk, so vast amounts of information that normally would have to be transported to the Space Station in the form of bulky notebooks, blueprints and other materials could easily be carried in a briefcase.

The OMIS is seen as having the potential to be used as a reference library with repair and maintenance manuals, blueprints, other reading or reference material, and even an entertainment center with films and music.



Greg Blackburn, Systems Development and Simulation Division, demonstrates the OMIS in the Space Station command and control center mockup while Cathy McDonald of McDonnell Douglas looks on. Below right, Blackburn scans displayed on the small OMIS display screen.



Albert Wetterstroem, Space Station Advanced Development Office, said OMIS was developed by McDonnell-Douglas using existing technology as part of an Advanced Development Program contract. The design goal was to demonstrate the OMIS concept for astronauts' use both inside and outside the Space Station.

Crew members can use the normal TV monitor in a Space Station Module or an astronaut on EVA could use the mini-television monitor inside his or her helmet to receive exactly the same information on how to make repairs on Space Station equipment.

The OMIS equipment was delivered to the Crew Control Mockup (CCM) in the Systems Development and Simulation Division last August.

Gregory Blackburn, an engineer in the CCM who is demonstrating and testing OMIS, said the system is for "brainstorming" for ideas on practical applications and improvements to both hardware and software.

The OMIS demonstration shows video of astronauts in training exercises in the underwater facility at McDonnell-Douglas, Huntington Beach, using various inflight maintenance tools for contingency operations. Conceivably, OMIS could replace many hours of training activities by having audio-visual instructions available for all potential onboard repair procedures.

"It is a very effective instruction system," Wetterstroem said. "You can have someone instructing you as they point to a picture or demon-

strate the tool without tying up a large number of ground personnel."

A controlled test was conducted recently in the CCM using engineers as subjects. The purpose of the test was to get feedback from the future users and designers of the system on whether or not they found it helpful, how to make it more user-friendly, and suggestions for other improvements. "The comments were very favorable—the subjects were enthusiastic about the concept. Imagine, an entire set of Space Station maintenance manuals, blueprints, and operation procedures in one briefcase. Furthermore, the information is in color, live action is available, and the pages never get dirty or torn," Wetterstroem said, describing the test results.

## NASA planning extensive supernova science program

NASA's Office of Space Science and Applications is embarking on a multi-year, multi-vehicle observation program to investigate the supernova 1987a.

The scientific program will stretch over the next two years and will include balloon and sounding rocket missions, aircraft flights, satellite and radio observations and a special computer communications network to link scientists together.

The comprehensive program has been assembled under the guidance and direction of OSSA's Astrophysics Division. Most of the Division's science and management staff have been working to develop this program since shortly after the supernova was discovered on February 24.

The program will investigate the evolution and behavior of supernova SN1987a in all energy wavelengths from radio through ultraviolet, visible and infrared light to X-ray and gamma ray emissions. NASA also is providing a forum for the exchange of theory and observational data among the various U.S. and international scientists involved by sponsoring workshops and providing a computer network for the exchange of messages and the processing of data.

The satellites involved in the supernova study are the International Ultraviolet Explorer (IUE) and the Solar Maximum Mission (SMM) spacecraft, both managed by and operated out of Goddard Space Flight Center, and the Japanese Ginga (Astro-C) satellite.

The IUE was viewing the supernova within three hours of its detection by astronomers in the Southern Hemisphere. This durable scientific satellite provides the data for ultraviolet observations and is monitoring the overall brightness (magnitude) of the supernova.

Because of its capabilities, IUE is being used as a "trigger" for some of the planned balloon launches in which the supernova will be studied for its X-ray emissions. The IUE has also been instrumental in helping to define exactly which star in the Large Magellanic Cloud exploded. The Large Magellanic Cloud is a smaller, companion, galaxy to our own Milky Way.

The Solar Max Mission spacecraft is currently being used to monitor for the expected gamma ray emissions from the supernova. Solar Max is a sun-observing instrument which was repaired on-orbit by astronauts in 1984 and includes a gamma ray detector among its many sensors.

The Ginga (Astro-C) is a Japanese scientific satellite designed to observe stars in X-ray wavelengths. It is being used to monitor the supernova for X-ray emissions on a weekly basis.

NASA has selected four scientists and their associated scientific payloads for balloon missions in early May from Australia. This is the first of five and perhaps as many as eight balloon campaigns which are being planned.

The campaigns are designed to acquire data on the gamma ray emissions from the supernova. Gamma rays tell the story of nucleosynthesis — the creation of matter by stars — and are an important element in the understanding of the physics and evolution of the universe. Scientists believe all of the heavier elements such as carbon, oxygen, silicon, iron, silver and gold are created in supernova explosions and that when new stars form, any planets which also form do so from debris of previous supernova.

The balloon missions will all carry gamma-ray instruments and are currently planned every three or

four months through 1988 with the chance that some flights will be scheduled in 1989 to take advantage of newly-designed instruments. All the flights will be from Australia because the Large Magellanic Cloud is only visible in the Southern Hemisphere.

NASA and the Australian Department of Science have agreements which allow Goddard's Wallops Flight Facility to stage balloon missions there.

The sounding rocket program has also selected principal investigators and scientific payloads for X-ray and ultraviolet investigations commencing as early as November, 1987, again from Australia. Although not able to carry the payload aloft for nearly as long as balloons, which can remain at high altitudes for days at a time, the sounding rockets will enable the payload to leave Earth's atmosphere and are slightly more valuable for certain wavelength observations.

This combination of sounding rocket and balloon missions will cover most of the phenomena of interest in the high energy emissions from the supernova elements. The sounding rocket launches generally will take place based on observations from the IUE and Ginga spacecraft, which, in this sense, also serve as "early warning" indicators for X-ray and ultraviolet activity.

Although the IUE, SMM and Ginga spacecraft have ultraviolet, X-ray and gamma-ray detectors, the sensitivity of the spacecraft sensors is much lower and typically of rougher resolution than the instruments which will be flown on the balloons and sounding rockets. In addition, the spacecraft sensors are one and sometimes two generations behind the instrumentation of the planned balloon and sounding rocket missions.

The Ames Research Center's C-141 jet transport, the Gerard P. Kuiper Airborne Observatory, is presently stationed in New Zealand carrying out a dual mission of Comet Wilson and supernova observations. The Kuiper provides a unique and regular opportunity for the infrared astronomers to observe at altitudes above 95 percent of the atmosphere's water content. Water vapor is nearly opaque to infrared emissions from sources beyond our own solar system. Observations of supernova infrared energy using the Kuiper are expected to provide crucial information about the abundances of different elements in the pre-supernova star and elements produced by the explosion itself. Far infrared observations will provide information about the composition of the dust and whether or not it was pre-existing or was also created by the explosion.

As soon as the expanding shell of ionized gasses from the supernova cools sufficiently, the infrared observations will be able to look into the shell and provide information about the densities in the core of the supernova shell. Infrared energy also provides a clue as to the "before" and "after" composition of that part of the Large Magellanic Cloud. NASA already has solicited proposals from the infrared astronomy scientists and will solicit additional scientific proposals as more information from the supernova becomes known.

The Jet Propulsion Laboratory's Deep Space Network is providing radio astronomy and radio interferometry observations of the supernova on a regularly scheduled but non-interference basis. The DSN provides the essential communications link between NASA spacecraft operations centers and the deep-space probes such as the

Pioneers and Voyagers. The DSN station at Tidbinbilla, Australia, has already successfully achieved a three station very-long-baseline interferometry network with the Australian National Observatory at Canberra and the Commonwealth Scientific and Industrial Research Organization's Landsat station at Alice Springs.

The goal is to achieve a seven-element VLBI array using the DSN as the electronic link and providing a listening aperture as large as the continent of Australia. Radio waves are emitted by synchrotron radiation, by the effects of the shock wave of the expanding shell and by the rotation of the remaining neutron star. Radio astronomy observations are the only means of imaging the expanding shell at this early stage.

Radio astronomers are already suggesting that this supernova will be the brightest radio source in the southern skies. Radio observations with this multiple-element interferometry network are planned to continue for the next several years — again on the same non-interference basis.

NASA has also planned and set into place a special information system network. The network will tie the various science teams together so that planning and reporting activities and science team messages can be handled quickly. The network will also provide a channel for transmitting data from one site to another (whether it be Australia or university campus) and will also provide for computation of results.

All these activities will be carried out with existing OSSA funds. The program redirects the use of about \$20 million worth of NASA's science funding to study this once-in-400-year event and to maximize the science return.

# Roundup Swap Shop

All Swap Shop ads must be submitted on a JSC Form 1452. The forms may be obtained from the Forms Office. Deadline for submitting ads is 5 p.m. the first Wednesday after the date of publication. Send ads to Roundup, AP3, or deliver them to the Newsroom, Bldg. 2 Annex, Room 147. No phone in ads will be taken.

## Property & Rentals

Sale: Heritage Park, 3-2-2A, 1,680 sq. ft., DR, paneled den w/FPL, large eat-in kitchen, large master BR, utility room, fenced, new paint, refrig., \$64,900. Linda, x30718 or 996-0462.

Sale: Bacliff, four 1BR cabins, furnished, all rented, fenced, A/C, \$42,500, \$2,500 down, 10% for 10 yrs. x36959 or 559-2584.

Sale: Heavily wooded lot, view of Taylor Lake, all utilities available, \$19,500. 474-3181.

Sale: Pipers Meadow 1.5-story Ryland Blanco, master down, 2 up, 2.5 baths, formal living and dining, loft, breakfast room, wet bar, fans, upgraded carpet, 10 x 20-ft. patio, landscaped, \$82,900. Sharon or Doug, x35452 or 480-2313.

Rent: Barringer Lane 2 BR apartment, Webster area, \$340/mo., \$75 deposit, W/D hookup. 996-8113.

Sale: Camino South, 4-2-2D, both formals, utility, new kitchen, \$69,900. B.K., x31610 or 280-0896.

Sale/lease: El Dorado Trace condo, 2-2.5-2, furnished, stereo, TV, waterbed, \$695/mo. w/2 phones, cable, utilities paid, or \$54,500. 538-2262 or x33555.

Lease: 1 BR Condo, W/D, covered parking, FPL, appliances, burglar alarm, fresh paint, new drapes, 2 wks free, low deposit. Jim Briley, 282-1880 or 488-7901.

Sale: Lake Livingston 2 BR, 2 bath, large front porch, wooded lot, \$21,750, owner financing. 474-2981.

Sale: Wedgewood 3-2-2, large LR, den, new carpet, covered patio w/deck, \$56,500. 482-9168.

Lease: Lake Livingston waterfront house, 3-2, sleeps 8, fully furnished, pier, ex. fishing, skiing, swimming, weekend or weekly rates. 482-1582.

Sale: LaPorte, 3-1.5-2 house, adjoining lot, aluminum siding, new carpet, paint, remodeled kitchen, 9.5% assumable loan, \$55,000, owner equity \$9,000. Bonnie, x34407 or 930-9348.

Sale/lease: Pasadena/South Houston, 3-1.5-2, brick, central air/heat, all appliances, carpet, drapes, fresh paint, no pets. \$435/mo. or \$46,500 w/8.5% VA assumable loan at \$343/mo., owner equity \$16,500. 941-5908.

Sale: Custom-built 3,100-sq.-ft. house across from water, large wooded lot, 4-2.5-2, all large rooms, 4 walk-in closets, floored attic, many decorator features, \$149,000. Jerry, x38922 or 474-4310.

Sale/lease: Nassau Bay, 2,200-sq.-ft. townhouse, 3-2-2 plus study, new carpet, paint, large garage, deck, atrium, 20-ft. FPL, \$890/mo. Jerry, x38922 or 474-4310.

Lease: League City/Newport, 3-2-2, FPL, cathedral ceiling, skylights, mini-blinds, refrig., \$525/mo. 334-6138.

Lease: Heritage Park/Friendswood, new section, 3-2-2, FPL, large kitchen, microwave, fence, fan, new paint, refrig., \$525/mo. 482-6609.

Lease: Heritage Park 4-2-2, fence, new paint, fan, refrig., \$495/mo. 482-6609.

Sale: Rockport waterfront house, 1,400 sq. ft., 3 BR, 2.5 bath, 60-ft. deck, deep water access. 473-2709.

Sale: Camino South 3-2-2A, formal living, covered patio, storm windows, low equity, \$68,500. Andy or Kevin, 280-1746 or 280-9861.

Lease: West Galveston Island beach house, 3-2, furnished, day, week, month. Ed Shumilak, x37686 or 482-7723.

Sale: Univ. Trace townhouse, 2-2.5-2CP, all appliances, FPL, security system, under \$50,000, assumption. 333-4044.

Sale: East Huntsville, 10 acres on the hill in Acorn Hill Estates, \$3,000/acre, assume 8.5% note. 333-4044.

Rent: Gulf-front condo, fully furnished, sleeps 6, TV, stereo, weekend or weekly rates. 280-8644.

Lease: Barringer Knoll condo, 2-1, fans, balcony, appliances, 2 pools, clubhouse, playground, \$350/mo. plus \$150 deposit. 326-4395.

Sale/lease: CLC condo, 2-1-2, W/D connections, fans, icemaker, miniblinds, storage cable, new paint, floors, no pets. 488-0719.

Sale: Arlington Heights, 3-2-2A, ex. cond., 1,900 sq. ft., formal dining, large deck, miniblinds, \$75,000. Angela, 944-5786.

Lease: Sagemeadow subdivision, 4-2-2, fenced, FPL, \$550/mo. plus 1 mo. deposit. 481-8107.

Rent: Baybrook condo, 1 BR, on tennis court, pool, party room, refrig., W/D, \$300/mo. Gary, 333-6214.

Rent: Rooms in Friendswood home, wooded area, furnished or unfurnished, male or female, utilities, W/D, microwave, hot tub, cable TV, \$225/mo. Rowena, x31670 or 996-9249.

Sale: Alvin area, 8 acres, state highway 35 frontage, residential or commercial, \$500 down, BO. 485-6074.

## Cars & Trucks

'79 VW Rabbit, 4 dr., 5 spd., A/C, sunroof, dark brown, striping, low miles, \$1,800. Sharon or Doug, x35452 or 480-2313.

'77 Ford LTD Brougham, PS, PB, AC, auto., AM/FM, 80K mi., \$1,850. x31610.

'86 Chrysler Laser XE, 7.2K mi., loaded, assume note of \$350/mo. Patty, x30735 or 334-1226.

'78 Oldsmobile, good cond., rebuilt motor, new tires, AM/FM, A/C, appraised at \$1,300, will trade for Kawasaki 1000 LTD or Yamaha 950-1000 motorcycle in same cond. Scott, x38497 or 488-1044.

'78 Honda Accord LX, 2 dr., 5 spd., A/C, new engine installed '86, ex. cond., \$1,700 OBO. Celia, x38976 or 488-6431.

'84 Buick LeSabre, loaded, ex. cond., 53K mi., tilt, power seats, windows, mirrors, stereo, wire wheels, PS, PB, A/C, cruise, \$6,200 OBO. Mike Thompson, x33586 or 486-7289.

'82 Chevy window van, auto., PS, A/C, AM/FM/tape, \$4,150. 474-3181.

'82 Nissan Stanza XE, 5 dr., silver, A/C, AM/FM/cassette, 74K mi., ex. cond., one owner, \$3,300. Bob, x37226 or 335-1865.

'79 Chevy Caprice, 4 dr., V8, PB, PS, A/C, tilt, good tires, electric doors, windows, auto., cruise, \$1,100. 772-3207.

'77 Olds Delta 88 Royale, \$975. John K. Greer, Bldg. 4, Rm. 101, x30762 or 538-2327.

'84 Pontiac Fiero SE, white, brown int., AM/FM/cassette, A/C, good cond., 48K mi., \$5,900. Rick, 282-2714 or 559-2735.

'80 Chevy Citation, \$500. x31635 or 998-7396.

'81 Chevy Malibu Classic, 4 dr., silver, red velour int., high miles, runs fine, \$1,450. 554-7083 or x30453.

'79 Ford Fairmont Ghia, ex. cond., 4 dr., A/C, \$1,600 OBO. Kari, x35111 or 488-8919.

'78 Honda Accord, 2 dr., 5 spd., AM/FM, A/C, 130K mi., \$1,000. Don, 282-5358 or 481-2195.

'85 Honda Civic, 5-dr. wagon, 34-45 mi./gal., was \$6,100, now \$5,100. Ernie, 486-8815 or 473-0291.

'81 Honda Civic 1500 GL, A/C, cassette, silver, 4 spd., hatchback, \$2,520 OBO. Karen, x38850 or 520-8348.

'83 Camaro Berlinetta, loaded, new tires, brakes, \$6,200. 482-6027.

'80 Datsun 510 wagon, clean, dependable, \$1,750. 482-6027.

'76 Chevy van, A/C, PS, PB, overdrive, one owner, \$1,595. Bob, x39388 or 486-9811.

'82 Buick Riviera, V8, loaded, ex. cond. \$6,500 OBO. 482-1535.

'81 Datsun 310 GX hatchback, 4 cyl., 5 spd., 56K mi., dependable, \$1,600. 481-1382.

'59 Mercedes Benz 220S. David, x35464.

'78 Camaro, A/C, PS, PB, AT, tilt wheel, chrome wheels, \$2,200 OBO. Bill Wood, x33838 or 554-2283.

'70 Firebird Esprit, semi-classic, all orig., rally wheels, white w/red interior, \$2,000. Dave, 333-1425.

'82 Grand Prix Brougham, PS, PB, A/C, velour interior, power sunroof, AM/FM/cassette, cruise, tilt wheel, midnight blue, 49K mi., \$5,200 OBO. x31761.

'83 16-ft. Hobbie Cat Special Edition, multi-colored sails, galvanized trailer w/custom boat box, many extras, stored indoors. \$2,990. Carla, x30181 or 538-1148.

Mistral Maui sailboat, 6.0m bi-radial sail, 4.3 sail, ex. cond., \$850 OBO. Scott, 482-6291.

Aircraft plans, half-scale P51D home-built fighter replica, \$175. Chuck, x32590 or 486-7141.

18-ft. AMF Trac catamaran, galvanized trailer, \$3,850. 333-3056.

Coronado 15 sailboat, galvanized Dilly trailer, buddy bearings, spare, ex. cond. 944-4758.

18-ft. Riveria, 110hp Johnson, galvanized trailer, 1 yr. old, \$7,000. 941-3516.

## Cycles

'79 Honda CX500 Custom draft drive, fairing, hard saddle bags, luggage carrier, good cond., dependable, \$900 OBO. Rich, x36900.

Free Spirit men's 27-in. 10 spd., ex. cond., was \$120, now \$60. Susan, 333-4150 or 480-6839.

'81 Honda CB750 Custom, new battery, 7K mi., recent tuneup, ex. cond., \$1,200 OBO. Brian, 480-5527.

'80 Suzuki GS450, 5K mi., garaged, \$500. Dave, 333-1425.

'82 Yamaha YZ125, water cooled, \$450. Jamey, 480-1202.

Sears 26-in. 12 spd., custom spring seat, seldom used, \$40. Mike, x33206 or 333-3748.

Kawasaki KE 100 Enduro, street legal, inspection, license, ex. cond., \$500. Josh, 486-0581.

Omega 10-in. 2-way speakers, \$35/pr.; Utah 8-in. 2-way speakers, \$30/pr.; Garrard turntable, \$20; Scotch 90-min. chrome cassettes, carton of 20, \$20. 331-0133.

Waterbed, king sized, comforter, pillows, was \$1,200, now \$400. 280-9062 or 554-4228.

Radio Shack Duofone Cordless Telephone ET-320, privacy, redial features, \$50; Zenith 19-in. color portable TV, \$100, 3-drawer white wicker chest, \$75; black wrought iron 4-candle hanging holder, \$15. Jana, x31653 or 480-5527.

HP Digital Cassette Drive for HP-41C w/HP-IL Interface Module, ex. cond., was \$675, now \$550. Carlos, x388798 or 554-7727.

Radio shack printer controller, 64K print buffer, model 26-1269, new, \$75. Tom Clark, x39842.

Compaq Deskpro, 640K RAM, 2 floppy drives, 20mb hard disk, 1200-baud modem, Panasonic KX-P1091 printer, software, \$2,500. 332-0023.

Zenith 19-in. color TV, table model, ex. cond., \$140. Joe, x31597 or 996-1667.

GTE model 2200 speaker-phone, 20-number dialer, never used, \$50; Magan-vox console stereo, walnut cabinet, \$40; large brass/marble table lamp, \$15; solid oak TV stand w/VCR shelf, walnut finish, holds up to 25-in. portable, \$20. Mike, x33206 or 333-3748.

AT&T touchtone telephones, 1 wall (white), 1 princess (tan), ex. cond., \$45/ea. Jim, x35566.

Computer, bundled software, 2 disk drives, monochrome monitor, integrated hardware/software system, menu program selection. J. Arnold, x34608.

Courier-Gladiator CB, desk speaker, \$150. 482-7820.

Daisy wheel TRS-210 printer, in box, assorted software for TRS Model 4, \$350 OBO. Dick, 538-1579.

Pool table, 8 ft., 1-in. slate, all wood, ex. cond., leather pockets, accessories, beautiful stained glass lamp, \$900. Angela, 944-5786.

Old GE canister vacuum cleaner, works, \$15. Jim, x35566.

Stratolounger couch, 2 yrs. old, dusty blue, 8-ft. long, ex. cond., \$350 OBO. 559-1286.

Sofa bed, \$100 OBO. 335-1865.

Waste King stainless dishwasher, \$50. x30453 or 554-7083.

Brown plaid sofa, \$75; kids' stereo, \$40; stereo cabinet, \$15. 485-1931.

Hot Point dryer, 1.8 yrs. old, ex. cond., electric, \$150. 486-7245.

Sofa and 2 matching chairs, good cond., \$165. x31588 or 488-1326.

Queen-sized waterbed, heater, liner, rails, shelf headboard, no leaks, \$100. Adam, 486-0581.

Sofa, gold floral, 7 ft., \$100; hide-a-bed, rust, \$75; Contour chair, beige, \$75; dining room drop-leaf table, \$75. Barcalounge chair, \$30. 482-4260.

Extra long 4-section couch, gold, matching chairs, good cond., \$150 or separately. Linda, x39658.

Office desk, 3 x 6-ft., good cond., \$200. 332-1864.

Energy efficient window-mount air conditioner, 9,800 BTU/hr., 110 hookup, used 4 summers in Oregon, ex. cond., \$100. 438-1905.

Full-sized mattress, box springs, \$60; king-sized set, frame, headboard, 6-ft. dresser, highboy, nightstand, BO. Nancy, 280-1992 or 480-8067.

GE refrigerator/freezer, 2-dr., 15 cu. ft., light yellow, \$150; long-range TV antenna, 8-ft. boom, \$35. John Hoover, x31056.

Llama rug from Peru, fully lined, \$90. Valerie, x33835.

Harvest gold Philco refrigerator, frost-free top freezer, hookup for ice maker, on casters, 6 yrs. old, 17 cu. ft., \$175. Kim, x37753 or 996-0936.

6-ft. South American Boa Constrictor, friendly, likes children. Rich, x38519 or 996-7630.

Gentle children's horse, 9 yrs. old, \$500. 332-7035 or x30370.

Chow puppies, full-blooded, black, born March 15, \$150. x37815.

Two large Tiger Oscars, 1 large African Cichlid, 2.5 yrs. old, good health, \$40/set. 668-2230.

Free female pointer, white and brown, 4 yrs. old. Tom, x38959 or 486-9940.

Clarinet, Bundy, case, \$175. 334-1345.

Classical guitar, good cond., ex. tone, \$80. Plaque, x39034 or 474-2660.

Baldwin Overture organ, 2 keyboards, 13 pedals, conductor features, all manuals, bench, \$1,600. Tom Clark, x39842.

Garage sale, Saturday, April 25, 15810 Diana Lane, 9 a.m.-4 p.m.

Baby items, bumper pads for crib, \$5; Graco mechanical swing, \$15; baby girl clothes, 0-6 mos., all ex. cond. Carla, x30181.

Antique printer's gray, \$15. Cindy, x32998 or 486-8266.

DP Gympac 2000, ex. cond., attachments incl. Brian, 480-1841.

'80 Murray riding mower, 11hp, 36-in. cut, 3 spd., \$400. Greg Williams, x30695 or 482-6763.

Marcy EM/1, EM/2, EM/3 exercise machine, ex. cond. \$575. 996-9058.

Ladies' solitaire diamond ring, platinum body, 4.3 carats, was \$1,350, now \$700. Scott, x38497 or 488-1044.

Allen Organ, theater compact, small, built-in Leslie, \$350 OBO. IBM Selectric typewriter, \$90. Yamaha LT-100 Enduro, \$160 OBO; 30mb hard drive w/controller, \$250 OBO. 482-4260.

'75 Toyota shop manual, chassis, \$5. Dean Thompson, 332-2229.

Swimming pool Kreepy Krawly cleaning system, \$150. Samsonite patio set, \$75; pool slide, \$50. Gordon, x30518 or 486-4403.

Handmade leather crafts, wallets, key chain, belts, purses, plant holders, \$5-\$20/ea. Matrenia, x34144 or 947-6529.

Ladies' gray slingback high-heel shoes, size 5, never worn, \$20. Carla, x32633 or 643-7734.

South Park Memorial, 4-cemetery lots, section J, lot 39, perpetual care, were \$495/ea., now \$395/ea. Cookie, x30328 or 474-5610.

.357 Magnum Blackhawk, 4.5-in. barrel, hand-tooled western holster, belt. John, 472-7779.

Chrysler outboard motor, 50hp, control cables, \$390. x31588 or 488-1326.

'69 Camaro or Firebird parts, door, front disk brake change-over, new Koni shocks, VSE sway bars. John, 488-3265.

CJ7 hardtop, white, 8-pc. aluminum, incl. 2 doors w/roll-up glass, top, 2 sides w/windows, 2 rear corners, rear lid w/glass, \$75. Greg Williams, x30695 or 482-6763.

Pair of small woodgrain stereo speakers, \$5; soccer goal, \$2; set of 4 TV trays, \$10; soft rack to carry sailboard, \$15; child's bike, 4-5-yr.-old, \$3. 25 ft. plastic garden hose, \$2; set of fireplace tools, \$5. Ron, 488-7113.

TA-90, 9mm, 4.5-in. barrel, double action, 2-15 shot clips, \$225. Wayne, x32568 or 486-7141.

Grain-fed steer for slaughter, fed on natural food products. x30370 or 332-7035.

Ludwig Catering \$115 gift certificate to '87 bridal couple, \$25. x38004.

Pair of tubular bicycle racing wheels, Dura-Ace hubs, concop freewheel, one tire, \$50. x38004.

Smith and Wesson .357 magnum, stainless steel, model 686, 6-in. barrel, leather case, 2 pr. grips, \$250. Paul, x34309 or 280-9838.



Saturday, May 2, 1987 11:00 a.m. to 6:00 p.m.

## Photographic

Cannon AE-1, 50 mm 1.8 lens, case, bag, Vivitar MOD 3500 dedicated zoom flash w/nicad pack, charger, instruction manuals, \$250 OBO. 482-6744.

Minolta computerized Databank imprints date, time or sequential numbers, was \$120, now \$45. 332-2229.

Yashica 400mm, 135mm, 28mm lenses, doubler, tripod, filters, bag, \$225 OBO. Mike, 972-6458 or 476-9701.

Minolta accessories, 58mm 1.4 lens, \$40; bellows, \$25; electronic data bank, \$40. Dean Thompson, 332-2229.

## Wanted

Want short-haired black or black and white male kitten; canoe, \$100 or less; old inexpensive answering machine. 334-4361.

Want sectional sofa, traditional or modern, structurally sound, want to recover. Eileen, x31507 or 487-0149.

Want female roommate to share 2/2 apt. w/same, W/D, microwave, free cable, \$207.50 plus half utilities, references; Virginia, x36147 or 480-6792.

Want child's high chair and car seat. x30112 or 482-1317.

Want used 27-in. 10-spd. bicycle in good shape. 668-2230.

Want large men's buoyancy compensator and regulator in good cond. Kip, x35522 or 488-0052.

Want roommate to share 2-2 condo. Rick, 480-4218 or x36156.

Want used refrigerators, freezers, ice makers, window and central air conditioners, free pick-up or removal. Aubrey, x36580 or 339-1402.

Want children's bunk beds, mattresses. Lori,